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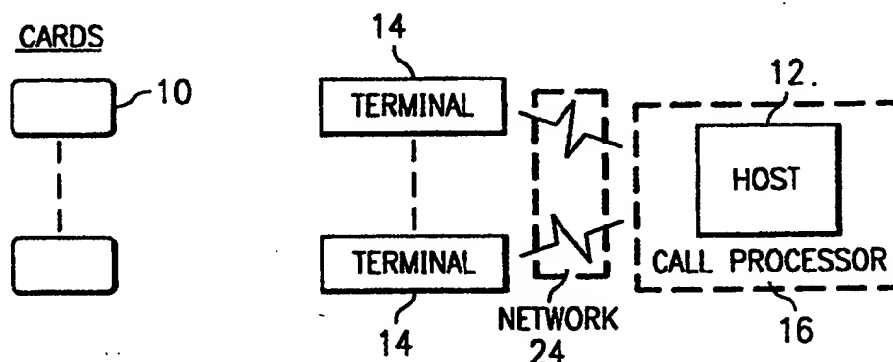
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(54) Title: PRE-PAID CARD SYSTEM AND METHOD



(57) Abstract

A pre-paid card system enables customers to make purchases using an authorized card. The system includes four main functional components: a plurality of cards (10), a host computer (12), a plurality of on-site activation terminals (14) and a main processor (16). Each of the cards (10) has a security number associated therewith. The card (10) is typically formed of cardboard, paper or plastic and may include the security number in cleartext under a suitable blackout. The main management and processing of the system is effected by the host computer (12). The host (12) includes a database for storing security numbers associated with authorized cards (10). The data terminals (14) are remote from the host computer (12) and connectable thereto for transmitting data between the terminals (14) and the host computer (12). The processor is controlled by the host computer (12) for enabling customer purchases using the authorized cards (10).

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PRE-PAID CARD SYSTEM AND METHOD

The present invention relates generally to pre-paid services and more particularly to a pre-paid card systems having a remote terminal to provide on-site activation and recharging of cards
5 in customer-defined amounts.

Pre-paid calling card services are well-known in the art. Such cards are typically purchased from vending machines and the like and come in fixed value increments, for example, \$10, \$20 and \$50. A
10 \$10 card provides the customer with a certain number (e.g., 30) minutes of long distance time from any touch-tone telephone to any location in the United States, regardless of the time of the call; the \$20 card provides twice that amount, and so forth.
15 Because the long distance charges are limited to the card's face value, neither the customer nor anyone who obtains possession of the card can run up a large bill.

In operation of the prior art system, cards are
20 batch- activated by the card provider in a limited number of predetermined values. A customer purchases one of these pre-activated cards by paying a fee. The card typically includes a predetermined identification code (which may be obscured by a
25 scratch off material). To use the card, the customer accesses the service (usually through an 800-number), enters the identification code (typically obtained from the back of the card), dials the destination number and the call begins.
30 Prior to dialing, the system may inform the user of a then-current card balance. If during a call the time remaining on the card is about to expire, the customer may be prompted (through a voice over) that only a certain amount of time (e.g., 30 seconds)
35 remains. When the designated time has expired, the call is automatically terminated.

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Such systems have proved commercially successful and desirable for several reasons. Pre-paid calling card customers avoid collect and operator assistance surcharges, and they can obtain long distance calling without credit and without payment of monthly bills. The cards themselves are easy to use. While the prior art systems have proven advantageous, they have somewhat limited flexibility. The most significant drawback is the requirement that pre-paid calling cards be issued in fixed or preset amounts. Also, once the time allotted to a particular calling card expires, the card is typically discarded, requiring the customer to carry multiple cards that can be stolen or lost. Existing systems do not have the flexibility to allow the customers to purchase variable amounts of calling time or to recharge "used" cards at the retail site.

There is thus a need for improved telephone pre-paid calling card systems that overcome these and other problems associated with the prior art.

It is an object of the present invention to provide a pre-paid card system that includes on-site activation of cards in varying amounts.

It is still another object of the invention to provide a pre-paid card system and method that facilitates point-of-sale activation of cards using data terminals connectable to a host computer.

It is yet another object of the present invention to provide a card system wherein on-site recharging is provided to enable a pre-paid card to be reactivated and re-used following expiration of all, part or none of an initial authorization amount.

It is a further object of the invention to provide a pre-paid card system having a plurality of data terminals remotely connectable to a host

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computer, each of the data terminals providing on-site point-of-sale activation and recharging of cards in varying amounts. The host computer dynamically manages each of the authorized cards.

5 It is still another object of the invention to provide a pre-paid card system wherein each authorized card has a security number associated therewith for enabling a host computer to track usage, rechargings, recharge locations and similar
10 management information. Preferably cards are authorized or re-authorized for variable amounts although "stale" cards, i.e., cards that have been sold but not used or reauthorized for a
15 predetermined time period (e.g., 6 months) may be purged from the system.

It is still a further object of the invention to provide a pre-paid card system wherein the host computer maintains a database of authorized cards, the database including detailed information about
20 the authorization, recharge and use status of each card in the system.

In a preferred embodiment, a pre-paid calling card system enables customers to access a telephone network and obtain long distance telephone service.
25 The system includes four main functional components: a plurality of calling cards, a host computer, a plurality of activation terminals and a call processor. Each of the calling cards preferably includes a body portion and a read-only memory
30 stripe having stored therein a security number. The card is typically formed of cardboard or plastic and may include the security number in cleartext under a suitable blackout. The main management and processing of the system is effected by the host
35 computer, which is connectable to the telephone network. The host includes a database for storing

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security numbers associated with authorized calling cards. The data terminals are remote from the host computer and connectable thereto for transmitting data between the terminals and the host computer.

- 5 The call processor is controlled by the host computer for interfacing one or more customers to the telephone network using the authorized calling cards.

- Preferably, each data terminal includes means
10 (such as a cardreader) for reading a calling card to determine the security number stored in the read-only memory thereof, means (such as a keypad) for entering any monetary amount corresponding to an amount of call authorization associated with a
15 particular calling card, means (such as a modem) for dialing the host computer to transfer the security number, the call authorization amount and the data terminal identification, and means (such as a display) for receiving and displaying a verification
20 message from the host computer authorizing receipt of the monetary amount.

- The data terminal allows for variable authorization and recharging of a calling card. When the cardreader cannot detect the security
25 number stored in the memory (which may occur, for example, when the card has been damaged and it is presented for recharging), the data terminal operator may enter the security number using the keypad to enable point-of-sale activation or
30 recharging of the card. By keeping track of the security number and the identification of the authorizing data terminal, the system can generate accounting and/or billing information so that system operator can determine which data terminal operator
35 authorized and/or recharged a particular calling

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card. This enables the system operator to reconcile all transactions.

In an alternative embodiment of the present invention, a user may activate or recharge a pre-paid card with an authorized dollar amount at a user activation terminal. The pre-paid card may then be used to purchase various goods and services up to the authorized dollar amount. The pre-paid card and activation terminals function in the same manner as discussed above with respect to a calling card. The activation terminals are interfaced with a main processor. The main processor includes a host computer responsible for management and processing of the system through a purchasing network. The host computer includes a data base for storing security numbers associated with authorized purchase cards and enables users to purchase goods and services up to authorized dollar amounts using the authorized pre-paid cards.

The foregoing has outlined some of the more pertinent objects of the present invention. These objects should be construed to be merely illustrative of some of the more prominent features and applications of the invention. Many other beneficial results can be attained by applying the disclosed invention in a different manner or modifying the invention as will be described. Accordingly, other objects and a fuller understanding of the invention may be had by referring to the following Detailed Description of the preferred embodiment.

For a more complete understanding of the present invention and the advantages thereof, reference should be made to the following Detailed Description taken in connection with the accompanying drawings in which:

FIGURE 1 is a block diagram of the telephone pre-paid calling card system of the present invention;

FIGURE 2 is a representative pre-paid calling card;

FIGURE 3 is a plan view of one of the data terminals of FIGURE 1 showing the keypad, display and card swipe components of the unit; and

FIGURE 4 is a block diagram of an alternative embodiment of the invention utilizing a pre-paid card system for purchasing a variety of goods and services up to an authorized dollar amount.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings, there is illustrated an exemplary pre-paid calling card system that enables customers to access a telephone network and obtain long distance telephone service. As seen in FIGURE 1, the system includes four main functional components: a plurality of calling cards 10, a host computer 12, a plurality of on-site activation terminals 14 and a call processor 16. As seen in FIGURE 2, each of the calling cards preferably includes a body portion ~~18~~ and a read-only memory stripe 20 having stored therein a security number. The card is typically formed of cardboard, paper or plastic and may include the security number in cleartext under a suitable user-removable scratch-off or other material 22 (such as an opaque tape). If desired, a smart card may be used to store the security number or other information, although preferably the system and method are implemented with so-called "dumb" or non-intelligent cards.

The main management and processing of the system is effected by the host computer 12, which is

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connectable to the telephone network 24. Although not meant to be limiting, preferably the host computer is a general purpose x86-type personal computer running a multi-tasking operating system such as UNIX. Alternatively, the host computer is implemented with any WINDOWS-based operating system. The host computer has sufficient storage associated therewith to enable a call record to be maintained for every authorized calling card in the system. The call record format will be described below.

Each of the plurality of on-site activation terminals 14 is preferably a Model XL300 from Verifone, although other models may be used. As seen in FIGURE 3, the activation terminal includes a housing 26 in which a number of functional components are included. A cardreader 28 includes a card-swipe slot 30 for receiving the calling card so that the memory stripe can be read. The unit also preferably includes a keypad 32 with various alphanumeric and control keys, and a display 34. The unit also includes a modem 36 (shown in phantom) for connecting the device over a telephone line to the host computer. The activation terminal also includes appropriate control circuitry for controlling the operation of the device.

Each of the terminals 14 is preferably located at a point-of-sale location where the calling cards are sold to users. The calling cards themselves may be stored under the terminal 14 in any convenient fashion. Generally, the data terminals are remote from the host computer and connectable thereto for transmitting data between the terminals and the host computer.

As can be seen, each data terminal 14 includes means (such as a cardreader) for reading a calling

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card to determine the security number stored in the read-only memory thereof, means (such as a keypad) for entering any monetary amount corresponding to an amount of call authorization associated with a particular calling card, means (such as a modem) for connecting to the host computer to transfer the security number, the call authorization amount and the data terminal identification, and means (such as a display) for receiving and displaying a verification message from the host computer authorizing receipt of the monetary amount. These particular input/output devices of the data terminal are merely exemplary, as other equivalent devices may also be used. For example, the cardreader may be replaced or supplemented with an optical scanner (to read a bar code or the like). When the cardreader cannot detect the security number stored in the memory (which may occur, for example, when the card is presented for recharging), the data terminal operator may enter the security number using the keypad to enable point-of-sale activation or recharging of the card. Likewise, the keypad may be replaced or supplemented with a voice recognition card connected to a microphone for providing limited speaker-independent or speaker-dependent discrete or continuous voice recognition. The communications link need not be made over a telephone line, but may be wireless, fiber optic or include any other well-known means for establishing a communications link between two locations. The display itself may be aural as opposed to visual.

The data terminals allow for point-of-sale variable authorization and recharging of calling cards. By keeping track of the security number and the identification of the authorizing data terminal, the system can generate accounting and/or billing

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information so that system operator can determine which data terminal operator authorized and/or recharged a particular calling card. This enables the system operator to reconcile all transactions.

- 5 The call processor of FIGURE 1 is controlled by the host computer for interfacing one or more customers to the telephone network using the authorized calling cards. In the preferred embodiment, the call processor includes dedicated
- 10 hardware and software for interfacing each of the data terminals to the host computer and to the telephone network. The call processor includes a T1 interface card (made by Mitel) which provides an external interface for two digital T1 circuits. In
- 15 the system, one T1 circuit interfaces to the data terminals, and the other T1 circuit interfaces to the telephone network. Each T1 card has a bandwidth of 24 multiplexed 64 K-bit/second channels. The call processor also includes a number of call
- 20 processing boards to playback voice files, record voice for other applications such as voice mail, recognize DTMF signalling, outdial DTMF on the outbound portions of each call, and monitor call progress. Preferably each board is a Natural
- 25 Microsystems Model VBX 1200 (and/or AG24), which includes a digital signal processor, and each such board handles up to 12 or 24 ports, respectively. In operation, each call in the system is assigned a port.
- 30 Preferably, each call record established in the system includes a number of pieces of information: the calling card security number, the identity of the store at which the card was issued (i.e., the identification of the authorizing terminal), the
- 35 card's issue date and time, the card's last use date and time, the card's last recharge store number

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(i.e., the identify of the data terminal at which the card was last recharged), the card balance (\$xxx.xx), the card's last recharge amount, a "card-in-use" flag and the card's last recharge date and time. By keeping track of the data terminals at which a card is initially authorized and later recharged, the system operator can reconcile multiple data from different store locations. This enables the system operator to credit or charge store operators for recharging provided by other store operators in the system.

The operation of the system can now be described. In a preferred call scenario, the possessor of an activated calling card first accesses the service through a dedicated telephone number (such as an 800 number) to which the host computer/call processor are connected. Upon call connection, the user is prompted to enter "security code" from back of card. The host computer checks the database and gives the appropriate response such as "your balance is ____ minutes." Alternatively, the computer may issue a message that "this card was purchased or last recharged more than 6 months ago, please buy more TeleBuck\$SM and call again" or "this security code is invalid" as the case may be. If there is a balance, the computer prompts the user to enter the area code and number that the user desires to call. The call is connected and if an answer is detected, the computer keeps track of the minutes used as the call proceeds. If the balance reaches 2 minutes, the caller is warned with a "2 minutes left" message and likewise at 30 seconds. When the balance is exhausted, the computer cuts off in the conversation and plays a message such as "time is up, buy more TeleBuck\$SM at any retail location or call us at 1 800 xxx-xxxx for recharge options".

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The following is a typical card activation or recharging scenario. Assume a customer comes up to the counter and requests \$12 worth of calling time. The clerk then obtains the next calling card from the plurality of cards, and begins the activation process. This is achieved by pressing the "Sell New Card" key (1). The new card is then swiped through the card reader slot. The amount of the transaction is then entered on the keypad. At this point the terminal dials out via the modem and waits for an answer. After communicating with the host, transmitting the request, the card and terminal identifiers, and receiving a verification, the unit displays a suitable response message. The operator is then prompted to collect the funds and this message (e.g., by a message, "Done Collect \$xxx.xx") tells the operator that the security number on this card has been activated for the amount shown. The transaction is completed by giving the card to the customer. If the customer desires to pay using a credit card which itself needs to be verified, the data terminal may also be used for this purpose. It should be further noted that the data terminals may be implemented in existing payment terminals such as credit card, ATM or money order machines, and these existing payment terminals may be modified to accept other forms of payment.

Referring now to FIGURE 4, there is illustrated an alternative embodiment of the present invention wherein there is illustrated a block diagram of a pre-paid card system. Unless otherwise specified, this embodiment functions in much the same manner as the pre-paid calling card system discussed with respect to FIGURES 1 through 3. In this embodiment a variable amount of money is pre-authorized into a card 50. The pre-paid cards 50 include a body

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position 18 and read only memory stripe 20 having a security number stored thereon as shown in FIGURE 2; alternatively, the security number may be the user's account number, a personal identification number
5 (PIN) or some other information generally known only to the user whether encoded on the card 50 or not. The cards 50 may be credit cards, debit cards, smart cards, or any other type of purchasing card which is currently available or may in the future become
10 generally available. The cards 50 are activated or recharged at a plurality of on-site activation terminals 52. The on-site activation terminals 52 have the same hardware and characteristics as the terminal discussed with respect to FIGURE 3. The
15 on-site activation terminals 52 interact with a main processor 54 operated by a host computer 56 via any of a variety of types of interconnecting networks 58, for example, a telephone network.

The hardware and software for implementing the
20 main processor 54 and host computer 56 are similar to that discussed with respect to the call processor 16 and host computer 12 of FIGURE 1. The host computer 56 contains sufficient storage associated therewith to enable purchase records to be
25 maintained for each authorized card 50 in the system. Preferably, each purchase record established in the system includes a number of pieces of information: the card security number, the identity of the store at which the card was
30 issued (i.e., the identification of the authorizing terminal), the card's issue date and time, the card's last use date and time, the card's last recharge number (i.e., the identity of the data terminal at which the card was last recharged), the
35 purchase balance of the card (\$xxx.xx), the card's last recharge amount, the card's last recharge date

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and time, and transaction codes associated with each purchase. By keeping track of the data terminals at which the card is initially authorized and later recharged, the system operator can reconcile
5 multiple data from different locations. This enables the system operator to credit or charge store operators for recharging providing by other store operators in the system.

The operation of the system may now be
10 described. In a preferred purchase scenario, the user of an activated card makes his purchase of a particular service or good and provides the card to a representative of the selling party. The seller or user is prompted to enter the "security code"
15 from the back of the card 50. The security code may be entered by a magnetic card reader, manual entry or any other well known method. Entry of the security code enables access to the main processor 54 via a dedicated purchasing network, such as a
20 telephone 800 number or other well-known type of communications method. Additionally, the user may manually enter a personal code (PIN number) known only to the user as an additional security measure. A purchase amount is also entered indicating the
25 amount of a desired purchase. The host computer 56 of the main processor 54 checks the database for the data associated with the codes and notifies the seller and/or user if a sufficient balance is present to make the desired purchase. If a
30 sufficient balance is not available, the host computer 56 may issue a receipt or message indicating the available balance and updated information concerning the purchase record. If a sufficient balance is present, the host computer 56
35 deducts the entered purchase amount from the card's balance and associates a transaction code with the

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purchase. The seller then completes the sale to the user. Upon completion of the sale, the user is provided with a receipt indicating the remaining balance on their card 50 or other information
5 relating to their purchase record.

The card activation or recharging scenario is the same as that previously discussed with respect to a pre-paid calling card. The card 50 is activated or recharged with a set dollar amount
10 enabling a user to purchase goods and services up to the pre-paid limit at any location that accepts said card as payment. During a typical card activation scenario, a customer requests an additional balance on the card from an activation terminal 52. This
15 may be done directly by the user or through a clerk manning the terminal. The card is swiped through the card reader slot and the amount to be added to the pre-authorized card balance is entered on the keypad. At this point, the terminal dials out via
20 the modem and awaits a response from the host computer 56. After communicating with the host computer 56 and transmitting the required information, the activation terminal 52 receives and displays a suitable response message. The clerk or
25 user is then prompted to provide the required funds and is informed that the security number on the card has been activated for the amount shown. The transaction is completed by returning the card to the customer.

30 It is to be further noted that while the present invention has been described with respect to providing a pre-paid calling card system or a pre-paid card system, that the purchase of any goods, service or activity may utilize the pre-paid
35 card system of the present invention as an alternative to pay-as-you-go or credit services.

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It should be appreciated that the specific
embodiments disclosed above may be readily utilized
as a basis for modifying or designing other
structures for carrying out the same purposes of the
5 present invention. It should also be realized by
those skilled in the art that such equivalent
constructions do not depart from the spirit and
scope of the invention as set forth in the appended
claims.

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CLAIMS

What is claimed is:

1. A pre-paid calling card system to enable customers to purchase calling cards at predetermined locations and to use such calling cards to access a telephone network having at least one telephone, comprising:
 - a plurality of cards, each of said calling cards having a security number associated therewith that must be entered at a telephone to obtain access to the telephone network;
 - a host computer including at least one input port and a database for storing security numbers;
 - at least one data terminal remote from the host computer and connectable to the input port for associating an amount of call authorization to a security number of a calling card using data transmitted between the data terminal and the host computer, the means for associating of the data terminal including:
 - means for entering the security number;
 - means for entering any monetary amount corresponding to the amount of call authorization;
 - means for connecting to the host computer to transfer the security number, the call authorization amount and an identification code associated with the data terminal; and
 - means responsive to the transfer for receiving a verification message from the host computer authorizing receipt of the monetary amount to thereby associate the call authorization amount to the security number; and
 - a call processor responsive to entry of a security number for enabling the customer to access the telephone network using the telephone.

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2. The pre-paid calling card system as described in Claim 1 wherein the means for entering the security number of the data terminal is a cardreader.

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3. The pre-paid calling card system as described in Claim 1 wherein the means for entering any monetary amount of the data terminal is a keypad.

10

4. The pre-paid calling card system as described in Claim 1 wherein the connecting means of the data terminal is a modem.

5. The pre-paid calling card system as described in Claim 1 wherein the means for receiving of the data terminal is a display.

6. The pre-paid calling card system as described in Claim 1 wherein the host computer database stores a call record for each calling card security number, the call record including the data terminal identification code and the call authorization amount.

25

7. A pre-paid calling card system to enable customers to purchase calling cards at retail establishments and to use such calling cards to access a telephone network having at least one telephone comprising:

30

a plurality of calling cards, each of said calling cards having a security number associated therewith that must be entered by a customer at the telephone to obtain access to the telephone network;

a host computer connectable to the telephone network and including at least one input port and a database for storing security numbers;

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a plurality of data terminals located at the retail establishments remote from the host computer and each connectable to the input port for associating an amount of call authorization to a security number of a calling card using data transmitted between the data terminal and the host computer, the means for associating of each data terminal including:

- means for reading a calling card to determine the security number;
- means for entering a monetary amount corresponding to the amount of call authorization;
- means for transferring to the host computer the security number, the call authorization amount and an identification code associated with the data terminal;
- means responsive to the transfer for receiving a verification message from the host computer authorization receipt by the retail establishment of the monetary amount to thereby associate the call authorization amount to the security number; and
- a call processor responsive to entry of a security number by a customer for enabling the customer to access the telephone network using the telephone.

8. The pre-paid card system as described in Claim 7 wherein the host computer database stores a record with each card security number, the record including the data terminal identification code.

9. A calling card system, comprising:
a host computer having a database;

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a plurality of data terminals connectable to the host computer, each data terminal identified by a data terminal identification code and including means for authorizing calling card security numbers
5 in selectable call authorization amounts; and
a record stored in the database for each calling card security number authorized by a data terminal, at least one record including an initial call authorization amount and any recharge call
10 authorization amount, and the data terminal identification codes identifying the data terminals at which the initial and any recharge call authorization amounts were issued such that call authorization amounts for the calling card which are
15 generated by multiple data terminals can be reconciled.

10. A pre-paid card system to enable users to obtain goods and services using cards having
20 pre-authorized, selectively determined purchasing limits, comprising:

a plurality of cards, each of said cards having a security number associated therewith;

a host computer including at least one input
25 port and a database for storing security numbers associated with authorized cards;

at least one data terminal remote from the host computer and connectible to the input port for transmitting data between the terminal and the host
30 computer to thereby pre-authorize a card up to a selectively determined purchasing limit, the data terminal including:

means for entering a security number associated with the card;

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means for entering a monetary amount
representing the selectively determined
purchasing limit associated with the card;

5 means for connecting to the host computer
to transfer the security number associated with
the card, the purchasing limit associated with
the card;

10 means for receiving a verification message
from the host computer authorizing receipt of
the monetary amount; and

a main processor controlled by the host
computer for authorizing a user to purchase goods
and services valued up to the selectively determined
purchasing limit using the card.

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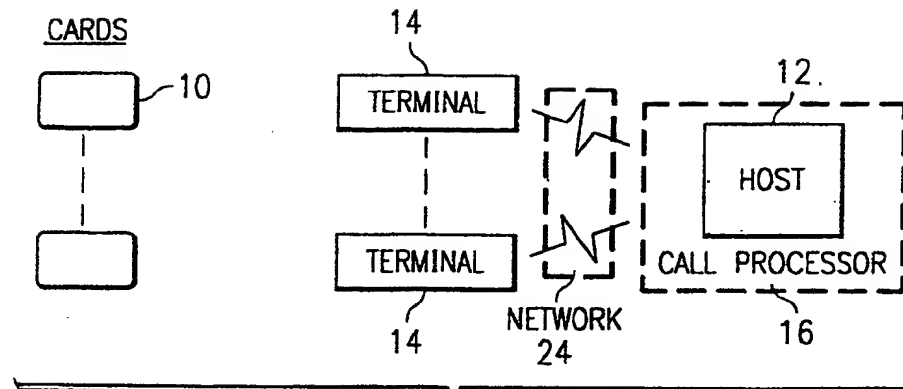


FIG. 1

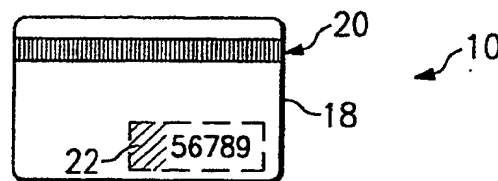


FIG. 2

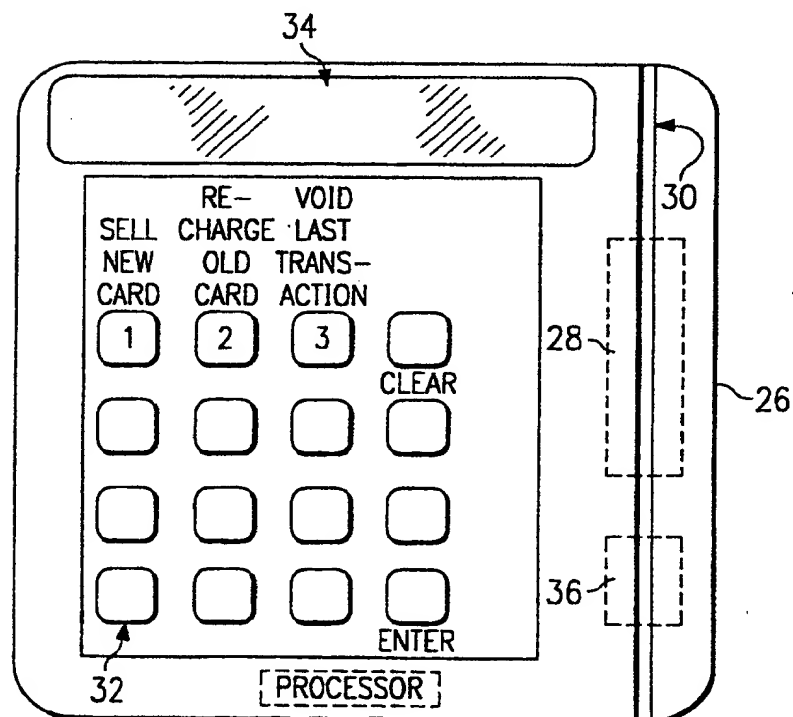


FIG. 3

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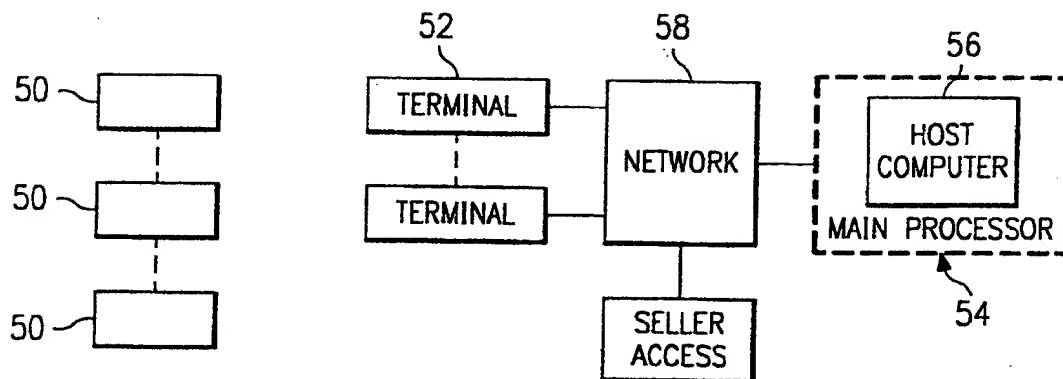


FIG. 4

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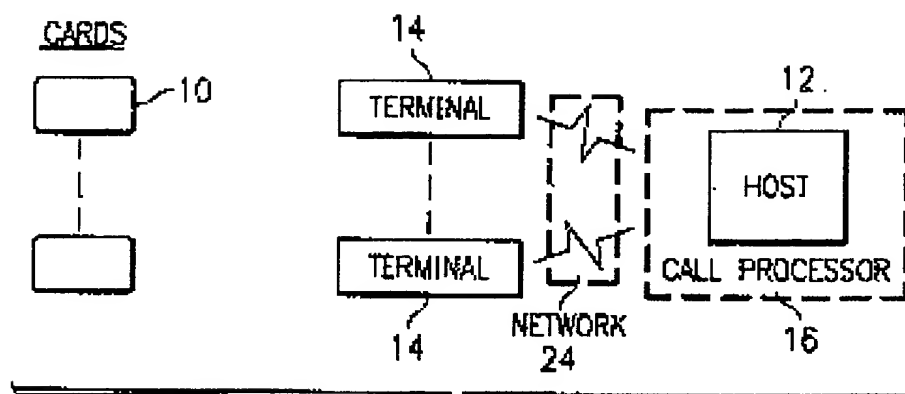


FIG. 1

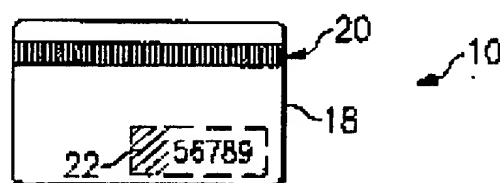


FIG. 2

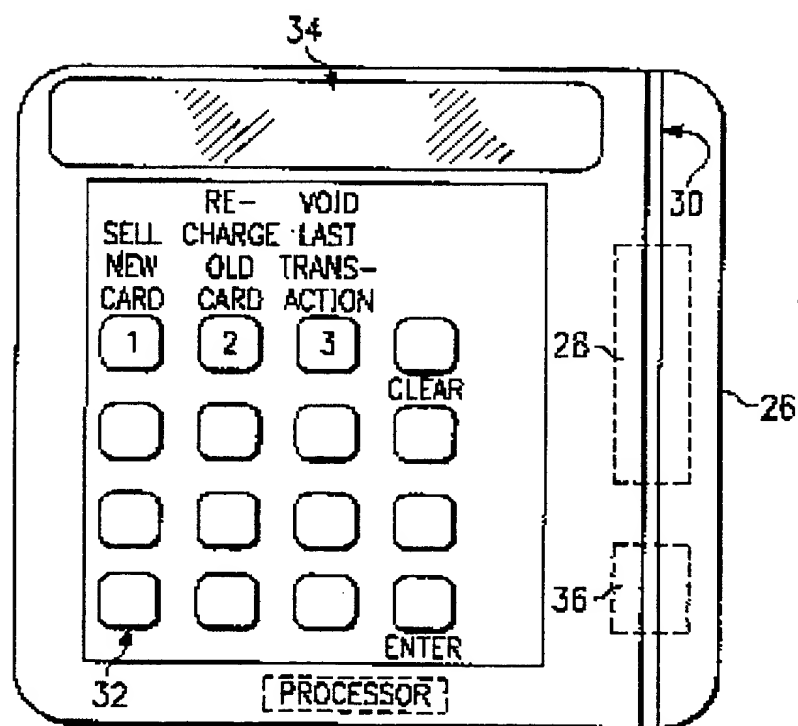


FIG. 3

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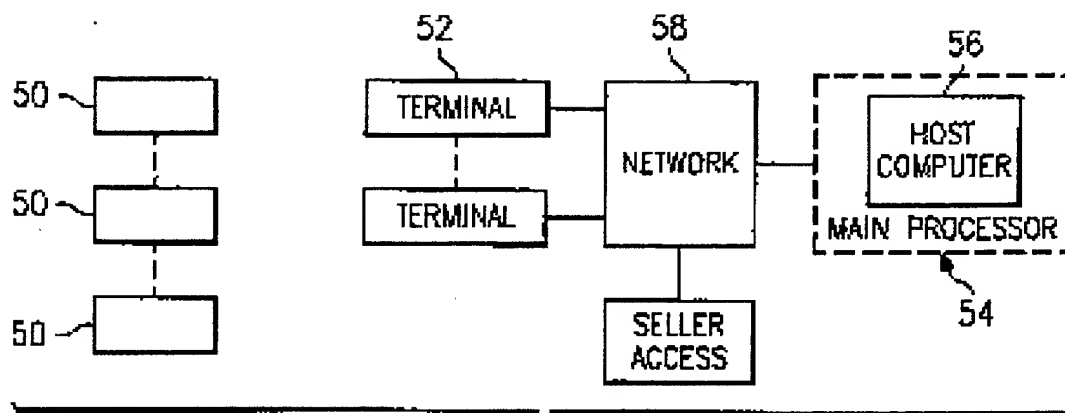


FIG. 4

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US95/07364

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04M 11/04, 11/00; G07D 7/00; G06F 7/04; G06K 5/00; G06F 7/08
US CL : 379/144, 91, 114, 112; 340/825.34, 825.35; 235/380, 381

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/144, 91, 114, 112; 340/825.34, 825.35; 235/380, 381

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US, A, 5,146,067 (SLOAN ET AL) 08 September 1992, see entire document.	1-10
Y	US, A, 4,706,275 (KAMIL) 10 November 1987, see entire document.	1-10
A	US, A, 4,951,308 (BISHOP ET AL) 21 August 1990, see abstract.	1-10
A	US, A, 5,138,650 (STAHL ET AL) 11 August 1992, see col. 9 lines 49+ and figure 10.	1-10
A,P	US, A, 5,352,876 (WATANABE ET AL) 04 October 1994, see abstract.	1-10

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be part of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Z" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 21 JULY 1995	Date of mailing of the international search report 01 SEP 1995
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer <i>Paul Loomis</i> PAUL LOOMIS Telephone No. (703) 305-4766

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